Sec. 9.8 Solve Equations by Factoring

Find the zeros of the polynomial

a. $y = (x-6)(x+5)$

$0 = (x-6)(x+5)$

Use the Zero Product Property

If $A \cdot B = 0$, then $A = 0$ or $B = 0$

$x - 6 = 0$ or $x + 5 = 0$

$+6 \quad +6 \qquad -5 \quad -5$

$\boxed{x = 6} \qquad \boxed{x = -5}$

b. $y = (x-1)(x-2)$

$0 = (x-1)(x-2)$

$0 \cdot -1 = 0$

$1 \cdot 0 = 0$

$x - 1 = 0 \qquad x - 2 = 0$

$+1 \quad +1 \qquad +2 \quad +2$

$\boxed{x = 1} \qquad \boxed{x = 2}$

c. $y = (2x-3)(x+4)$

$0 = (2x-3)(x+4)$

$2x - 3 = 0 \qquad x + 4 = 0$

$+3 \quad +3 \qquad -4 \quad -4$

$\frac{2x}{2} = \frac{3}{2} \qquad x = -4$

$x = \frac{3}{2}$

d. $y = x^2 + 3x - 10$

$0 = x^2 + 3x - 10$

Factor

-10
$1 \cdot 10$
$2 \cdot 5$
$-2 + 5$

$0 = (x-2)(x+5)$

$x - 2 = 0$
$+2 = 2$
$x = 2$

$x + 5 = 0$
$-5 \quad -5$
$x = -5$

e. $x^2 + 12x + 27 = 0$

27
$1 \cdot 27$
$3 \cdot 9$
$3 + 9$

$(x+3)(x+9) = 0$

$x + 3 = 0$
$-3 \quad -3$
$\boxed{x = -3}$

$x + 9 = 0$
$-9 \quad -9$
$\boxed{x = -9}$

f. $-8x^2 - 40x = 0$

$\frac{-8x^2}{-8x} \quad \frac{-40x}{-8x}$

$-8x(x+5) = 0$

$\frac{-8x}{-8} = \frac{0}{-8}$
$\boxed{x = 0}$

$x + 5 = 0$
$-5 \quad -5$
$\boxed{x = -5}$

g. $-10x^2 + 100x = 0$

$\frac{-10x^2}{-10x} \quad \frac{100x}{-10x}$

$-10x(x-10) = 0$

$\frac{-10x}{-10} = \frac{0}{-10}$
$\boxed{x = 0}$

$x - 10 = 0$
$+10 \quad +10$
$\boxed{x = 10}$

h. $\boxed{2}x^2 + 5x \boxed{-12} = 0$

-24

$1 \cdot 24$

$2 \cdot 12$

$\boxed{3 \cdot 8}$

$4 \cdot 6$

$-3 + 8$

$\underbrace{2x^2 - 3x}_{x} + \underbrace{8x - 12}_{4} = 0$

$x(2x-3) + 4(2x-3) = 0$

$(2x-3)(x+4) = 0$

$2x - 3 = 0$

$+3 \quad +3$

$\frac{2x}{2} = \frac{3}{2}$

$\boxed{x = \frac{3}{2}}$

$x + 4 = 0$

$-4 \quad -4$

$\boxed{x = -4}$

i. $\boxed{2}x^2 + 5x - 3 = 0$

-6

$1 \cdot 6$

$2 \cdot 3$

$2 + 3$

$\boxed{-1 + 6}$

$\underbrace{2x^2 - 1x}\ \underbrace{+ 6x - 3} = 0$